

Toxicants in Birds

Organochlorines Accumulate in Heron and Egret Chicks Sampled in the Houston Ship Channel

Thomas W. Custer
U.S. Fish and Wildlife Service, Victoria, Texas

The National Contaminant Monitoring Program (NCBP) is an effort of the U.S. Fish and Wildlife Service to measure concentrations of DDT and other persistent chemicals in the environment and to quantify changes in these levels. The NCBP has established a network of sampling stations in segments of the environment for which Federal agencies have authority. The wildlife component of this program, administered by the Patuxent Wildlife Research Center, includes the periodic sampling of European starlings (*Sturnus vulgaris*), mallards (*Anas platyrhynchos*), and American black ducks (*Anas rubripes*). In order to include an estuarine component into the NCBP, herons and egrets are being evaluated.

Eggs and chicks (five, ten, and 15 days of age) of snowy egrets (*Egretta thula*), and black-crowned night-herons (*Nycticorax nycticorax*) were collected in Narragansett Bay, RI; the Houston Ship Channel (HSC), TX; and San Francisco Bay, CA. Great egret (*Casmerodius albus*) eggs and chicks also were collected at the Texas colony. Eggs and chicks were analyzed for organochlorines; trace element and petroleum hydrocarbon analyses are pending.

DDE and polychlorinated biphenyls (PCBs) were detected in all eggs and chicks, and they accumulated as the chicks grew. At each location, black-crowned night-heron chicks accumulated both DDE and PCBs more rapidly than snowy egrets or great egrets. PCBs accumulated more rapidly in night-heron chicks in Rhode Island than California; however, PCB accumulation for snowy egret chicks did not differ among locations. Contaminant accumulation rates in heron and egret chicks could be used as a new wetland component of the NCBP.

The Occurrence of Chlorostyrenes in Egrets and Herons Collected in Galveston Bay

Clifford P. Rice
Patuxent Wildlife Research Center, U. S. Fish and Wildlife Service
and
 Thomas W. Custer
U. S. Fish and Wildlife Service, Victoria, Texas

While conducting routine GC/MS confirmations for organochlorine contaminants in birds collected from three geographically separated U.S. coastal estuaries (east, west, and Gulf), we uncovered what appears to be a site-specific problem with chlorostyrenes in the Galveston Bay area. The Galveston Bay levels of octa- and hepta-chlorostyrene were moderate to high in most of the samples (Table 1); especially when compared to residues of chlorostyrenes from other locations (Lake St. Clair, MI [Hebert *et al.*, 1990] ; and the river Neckar, Germany [Kypke-Hutter *et al.*, 1986]). Figure 1 shows the relative concentration of these type compounds, i.e., the Industrial Group, (hexachlorobenzene is included since it is similar in origin) vs. the other more typically reported organochlorine pollutant groups found in these samples: the PCB/DDE Group, the Chlordane Group and the Dieldrin/DDD/DDT Group. Figure 1 shows that the chlorostyrenes constitute a significant portion of the overall organochlorine load in these birds. Since this is not the first time this compound group has been reported for this area (King and Krynitsky, 1986 and King *et al.* 1987), it seems that its distribution, sources, fate and effects should be more thoroughly evaluated. The most likely source for chlorostyrenes is from the electrolytic production of chlorine (Kaminsky and Hites 1984).

Table 1. Chlorostyrene residues in egret and heron egg and tissue samples collected from Galveston Bay, Texas.

Species	Tissue Type	Estimated Concentration* (ug/g wet wt.)	
		Octachlorostyrene	Heptachlorostyrene
Great Egret	Egg	0.15	<0.01
Great Egret	Egg	1.4	2.0
Snowy Egret	Egg	0.01	<0.01
BC Night Heron	Egg	1.6	0.6
Great Egret	Carcass (5 dy old)	0.17	0.24
Great Egret	Carcass (5 dy old)	0.05	0.02
Snowy Egret	Carcass (5 dy old)	0.01	0.02
Snowy Egret	Carcass (5 dy old)	0.8	0.9
Snowy Egret	Carcass (10 dy old)	0.68	2.6
Great Egret	Carcass (10 dy old)	0.02	0.02
BC Night Heron	Carcass (15 dy old)	0.14	0.09
Great Egret	Carcass (15 dy old)	0.05	0.03
BC Night Heron	Liver (15 dy old)	0.05	0.02

10/10/10

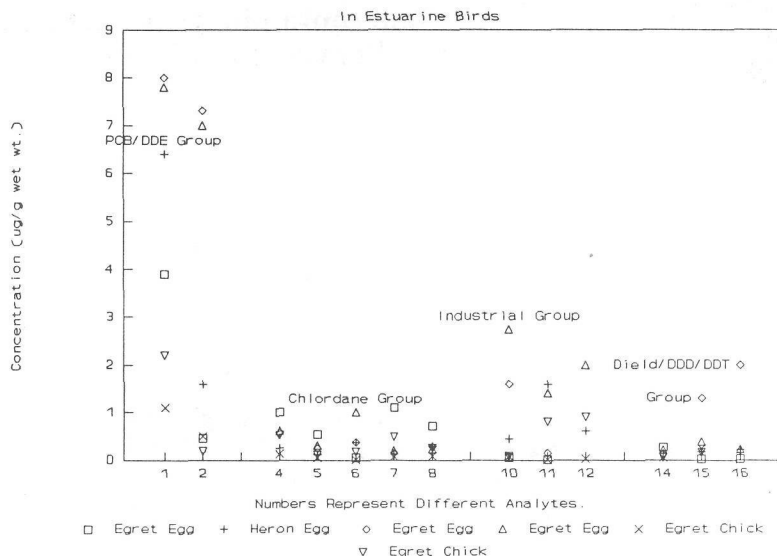


Figure 1. Organochlorines in waterbirds from Galveston Bay. (Analyte code: 1 = PCB; 2 = p, p'-DDE; 4 = Trans Nona.; 5 = Cis Nona.; 6 = Cis Chlor.; 7 = Oxychlor.; 8 = Heptachlor Epoxide; 10 = HCB; 11 = Octachlorostyrene; 12 = Heptachlorostyrene; 14 = Dield.; 15 = p,p'-DDT.)

The samples for this study were collected from Goat Island which has recently eroded away. This island was located about 1.5 miles north of Alexander Island in the HSC. There is a great deal of industrial activity in this area, and several likely manufacturing operations which could be sources for the chlorostyrene residues found in these samples.

Literature Cited

- Hebert, C. E., G. D. Haffner, I. M. Weis, R. Lazar, and L. Montour. 1990. Organochlorine contamination in duck populations of Walpole Island. J. Great Lakes Res. 16: 21-26.
- Kaminsky, R. and R. A. Hites. 1984. Octachlorostyrene in Lake Ontario: Sources and fates. Env. Sci. Technol. 18: 275-279.
- King, K. A., and A. J. Krynitsky. 1986. Population trends, reproductive success, and organochlorine chemical contamination in waterbirds nesting in Galveston Bay, Texas. Arch. Environ. Contam. Toxicol. 15: 367-376.
- King, K. A., C. J. Stafford, B. W. Cain, A. J. Mueller, and H. D. Hall. 1987. Industrial, agricultural, and petroleum contaminants in cormorants wintering near the Houston Ship Channel, Texas, USA. Colonial Waterbirds 10: 93-99.
- Kypke-Hutter K., J. Volgeslgesang, R. Malisch, P. Binnemann, and H. Wetzlar. 1986. The origin of a contamination of fish from the river Neckar with

hexachlorobenzene, octachlorostyrene and pentachlorobenzene formation in an industrial process. I. The course of the contamination in the upper section of the river Neckar. Z. Lebensm.-Unters. -Forsch. 182:464-470.